WHAT IS CLAIMED IS:

1. A membrane comprising:

a polyurethane including a polyester polyol, said membrane having a gas transmission rate of 15.0 or less for nitrogen gas wherein said membrane has an average thickness of approximately 20.0 mils.

2. The membrane according to Claim 1, wherein said polyester polyol of said polyurethane is selected from the group consisting of the reaction product of (a) a carboxylic acid having six or less carbon atoms and (b) a diol having six or less carbon atoms, wherein the repeating units of the polyester polyol formed by the aforesaid reaction has eight carbon atoms or less.

3. The membrane according to Claim 2, wherein the carboxylic acid is selected from the group consisting of adipic, glutaric, succinic, malonic and oxalic acids, and mixtures thereof.

4. The membrane according to Claim 3, wherein the carboxylic acid employed includes adipic acid.

5. The membrane according to Claim 2, wherein the diol is selected from the group consisting of ethylene glycol, propanediol, butanediol, neopentyldiol, pentanediol, hexanediol and mixtures thereof.

6. The membrane according to Claim 5, wherein the diol employed includes ethylene glycol.

7. The membrane according to Claim 2, wherein said polyurethane further comprises at least one extender.

8. The membrane according to Claim 7, wherein said extender is selected from the group consisting of alcohols and amines.

9. The membrane according to Claim 7, wherein said extender is selected from the group consisting of ethylene glycol, 1,3 propylene glycol, 1,4-butanediol and 1,6-hexanediol.

10. The membrane according to Claim 7, wherein said at least one extender and said at least one polyester polyol include active hydrogen containing groups.

11. The membrane according to Claim 7, wherein the ratio of polyester polyol to extender is between about 1:0 to about 1:12.

12. The membrane according to Claim 11, wherein the ratio of polyester polyol to extender is between about 1:1 to about 1:8.

13. The membrane according to Claim 10, wherein the ratio of isocyanate contained in said polyurethane to active hydrogen containing groups is between about 0.95:1 to about 1.10:1.

14. The membrane according to Claim 13, wherein the ratio of isocyanate to active hydrogen containing groups is between about 0.98:1 to about 1.04:1.

15. The membrane according to Claim 2, further comprising a hydrolytic stabilizer.

16. The membrane according to Claim 15, wherein said hydrolytic stabilizer is present in an amount of up to 5.0 wt.%.

17. The membrane according to Claim 15, wherein said hydrolytic stabilizer is selected from the group consisting of carbodiimides, polycarbodiimides and epoxidized soy bean oil.

18. The membrane according to Claim 2, wherein said polyurethane includes at least one plasticizer, said plasticizer being present in an amount of up to 40.0 wt.%

19. The membrane according to Claim 2, wherein said polyurethane includes at least one flame retardant, said flame retardant being present in an amount of up to 40.0 wt.%.

20. The membrane according to Claim 2, wherein said polyurethane includes at least one filler, said filler being present in an amount of up to 60 wt.%.

21. The membrane according to Claim 2, wherein at least one additive is employed, said additive being selected from the group consisting of antioxidants, ultra-violet stabilizers, thermal stabilizers, light stabilizers, organic anti-block compounds, colorants, fungicides, mold release agents and lubricants, said at least one additive being present in an amount of up to 3.0 wt.%.

22. The membrane according to Claim 2, further comprising at least one triol.

23. The membrane according to Claim 22, wherein said at least one triol includes trimethyol propane.

24. The membrane according to Claim 2, further comprising at least one material selected from the group consisting of co-polymers of ethylene and vinyl alcohol, polyvinylidene chloride, co-polymers of acrylonitrile and methyl acrylate, polyethylene terephthalate, aliphatic and aromatic polyamides, crystalline polymers and polyurethane engineering thermoplastics, said material being blended with said polyurethane prior to forming said membrane.

25. The membrane according to Claim 24, wherein said membrane includes up to about 70.0 wt.% polyester polyol based urethane.

26. The membrane according to Claim 25, wherein said membrane includes between about 5.0 wt.% to about 25.0 wt.% polyester polyol based urethane.

27. The membrane according to Claim 24, wherein said material selected from said group includes at least one copolymer of ethylene and vinyl alcohol.

28. The membrane according to Claim 27, wherein at least one of the copolymers of ethylene and vinyl alcohol has an ethylene content of between about 25 mol.% to about 48 mol.%.

29. The membrane according to Claim 2, wherein said membrane includes at least one polyurethane including soft segments selected from the group consisting of polyether polyols, polyester polyols formed from the reaction product of a carboxylic acid and a diol wherein the repeating units of the reaction product have more than eight carbon atoms, or mixtures thereof.

30. The membrane according to Claim 29, wherein said at least one polyurethane including soft segments selected from the group consisting of polyether polyols, polyester polyols formed from the reaction product of a carboxylic acid and a diol wherein the repeating units of the reaction product have more than eight carbon atoms, or mixtures thereof, is present in an amount of up to 30.0 wt.%.

31. The membrane according to Claim 29, wherein the polyurethane including the polyester polyol formed from a carboxylic acid and a diol wherein the reaction product has more than eight carbon atoms is selected from the group consisting of ethylene glycol isophthalate, 1,4 butanediol isophalate and 1,6 hexanediol isophthalate.

32. The membrane according to Claim 1, wherein said membrane has a gas transmission rate of less than about 10.0 for nitrogen gas wherein said membrane has an average thickness of approximately 20.0 mils.

33. The membrane according to Claim 32, wherein said membrane has a gas transmission rate of less than about 7.5 for nitrogen gas wherein said membrane has an average thickness of approximately 20.0 mils.

34. The membrane according to Claim 33, wherein said membrane has a gas transmission rate of less than about 5.0 for nitrogen gas wherein said membrane has an average thickness of approximately 20.0 mils.

35. The membrane according to Claim 34, wherein said membrane has a gas transmission rate of less than about 2.5 for nitrogen gas wherein said membrane has an average thickness of approximately 20.0 mils.

36. The membrane according to Claim 35, wherein said membrane has a gas transmission rate of less than about 2.0 for nitrogen gas wherein said membrane has an average thickness of approximately 20.0 mils.

37. The membrane according to Claim 1, wherein said membrane is elastomeric.

38. The membrane according to Claim 37, wherein said membrane has an elongation of at least about 250%.

39. The membrane according to Claim 38, wherein said membrane has a elongation of between 250% to about 700%.

40. The membrane according to Claim 37, wherein said membrane has a tensile strength of at least about 2,500 psi.

41. The membrane according to Claim 37, wherein said membrane has an 100% tensile modulus of between 350 to about 3,000 psi.

42. The membrane according to Claim 1, wherein said membrane has a durometer hardness ranging from about 60 Shore A to about 65 Shore D.

43. The membrane according to Claim 42, wherein said membrane has a durometer hardness ranging from about 80 Shore A to about 55 Shore D.

44. The membrane according to Claim 43, wherein said membrane has a durometer hardness ranging from about 85 Shore A to about 50 Shore D.

45. The membrane according to Claim 1, wherein said polyurethane is prepared from an isocyanate that is aromatic in nature.

46. The membrane according to Claim 45, wherein said isocyanate is diphenylmethane diisocyanate.

47. The membrane according to Claim 1, wherein said polyurethane includes:

(a) at least 50 wt.% of at least one barrier material selected from the group consisting of co-polymers of ethylene and vinyl alcohol, polyvinylidene chloride, co-polymers of acrylonitrile and methyl acrylate, polyethylene terephthalate, aliphatic and aromatic polyamides, crystalline polymers and polyurethane engineering thermoplastics, said at least one barrier material being blended with said polyurethane prior to forming said membrane;

(b) 1 wt.% to about 50 wt.% of at least one aliphatic thermoplastic urethane; and

(c) up to about 3 wt.% of one or more aromatic thermoplastic urethanes, wherein the total constituency of the blended layer is equal to 100 wt.%.

48. The membrane according to Claim 47, wherein said aromatic thermoplastic urethane is selected from the group consisting of polyester, polyether, polycaprolactone, polyoxypropylene and polycarbonate macroglycol based materials and mixtures thereof.

49. The membrane according to Claim 47, wherein said thermoplastic is based on aromatic 1,4,diphenylmethane diisocyanate.

50. The membrane according to Claim 1, wherein said membrane forms a first layer of a multi-layer structure.

51. The membrane according to Claim 50, further comprising a second layer formed from a material selected from the group consisting of co-polymers of ethylene and vinyl alcohol, polyvinylidene chloride, co-polymers of acrylonitrile and methyl acrylate, polyethylene terephthalate, aliphatic and aromatic polyamides, crystalline polymers, polyurethane engineering thermoplastics and mixtures thereof which is bonded to said first layer.

52. The membrane according to Claim 51, wherein said first and second layers are formed together such that hydrogen bonding occurs between said first and second layers.

53. The membrane according to Claim 51, wherein said first layer forms the outer layer of a tire.

54. The membrane according to Claim 1, wherein said membrane is employed as a component of a wheel.

55. The membrane according to Claim 54, wherein said wheel is an inline or roller skate wheel.

56. The membrane according to Claim 1, wherein said membrane is formed at least in part from a thermoset material.

57. The membrane according to Claim 1, wherein said membrane is employed as part of an orthopedic device.

58. The membrane according to Claim 1, wherein said membrane is employed as a cushioning device incorporated as part of a prosthetic device.

59. The membrane according to Claim 1, wherein said membrane is employed as part of a flotation device.

60. The membrane according to Claim 59, wherein said flotation device is substantially rigid.

61. The membrane according to Claim 60, wherein said flotation device is part of a boat hull.

62. The membrane according to Claim 59, wherein said flotation device is flexible.

63. The membrane according to Claim 62, wherein said flotation device is in the form of a tube or raft.

64. The membrane according to Claim 1, wherein said membrane is employed as an inflatable component in athletic equipment.

65. The membrane according to Claim 1, wherein said membrane is employed as a component of medical equipment.

66. The membrane according to Claim 65, wherein said medical equipment is in the form of a catheter balloon.

67. The membrane according to Claim 1, wherein said membrane is employed as a fuel line.

68. The membrane according to Claim 1, wherein said membrane is employed as a fuel storage tank.

69. A membrane comprising:

a polyurethane including a polyester polyol, said membrane having a durability of at least 200,000 cycles under a KIM test analysis, wherein said membrane is in the form of a closed container having an average wall thickness of 18 mils and is inflated with nitrogen gas to 20.0 psig.

70. The membrane according to Claim 69, wherein said membrane has a durability of more than 750,000 cycles under a KIM test analysis, wherein said membrane is in the form of a closed container having an average wall thickness of 18 mils and is inflated with nitrogen gas to 20.0 psig.

71. A membrane comprising:

a polyurethane including a polyester polyol, said membrane having a yellowness index of 4.0 or less, wherein said membrane has an average wall thickness of 32 mils.

72. The membrane according to Claim 71, wherein said membrane has a yellowness index of 1.6 or less when said membrane has an average thickness of 32 mils.

73. A membrane comprising:

a polyurethane including a polyester polyol, said membrane having a total transmission of light at a level of at least 90.0%, wherein said membrane has an average wall thickness of 32 mils.

74. A substantially closed container comprising:

a polyurethane including a polyester polyol having a gas transmission rate of 15.0 or less for nitrogen gas wherein said container has an average thickness of approximately 20.0 mils.

75. The container according to Claim 74, wherein said polyester polyol of said polyurethane is selected from the group consisting of the reaction product of (a) a carboxylic acid having six or less carbon atoms and (b) a diol having six or less carbon atoms, wherein the repeating units of the polyester polyol formed by the aforesaid reaction has eight carbon atoms or less.

76. The container according to Claim 75, wherein the carboxylic acid is selected from the group consisting of adipic, glutaric, succinic, malonic and oxalic acids, and mixtures thereof.

77. The container according to Claim 75, wherein the diol is selected from the group consisting of ethylene glycol, propanediol, butanediol, neopentyldiol, pentanediol, hexanediol and mixtures thereof.

78. The container according to Claim 75, further comprising at least one extender.

79. The container according to Claim 75, further comprising a hydrolytic stabilizer.

80. The container according to Claim 75, further comprising at least one plasticizer.

81. The container according to Claim 75, further comprising at least one flame retardant.

82. The container according to Claim 75, wherein at least one additive is employed, said additive being selected from the group consisting of antioxidants, ultra-violet stabilizers, thermal stabilizers, light stabilizers, organic anti-slip compounds, anti-block compounds, colorants, fungicides, mold release agents and lubricants, said at least one additive being present in an amount of up to 3.0 wt.%.

83. The container according to Claim 75, wherein said polyurethane further comprises at least one soft segment selected from the group consisting of polyether polyols, polyester polyols formed from the reaction product of a carboxylic acid and a diol wherein the repeating unit of the reaction product has more than eight carbon atoms, or mixtures thereof.

84. The container according to Claim 83, wherein said polyurethane includes up to 30 wt.% of soft segments selected from the group consisting of polyether polyols, polyester polyols formed from the reaction product of at least one carboxylic acid and at least one diol wherein the repeating units of the reaction product thereof includes more than eight carbon atoms, or mixtures thereof.

85. The container according to Claim 74, further comprising at least one material selected from the group consisting of co-polymers of ethylene and vinyl alcohol, polyvinylidene chloride, co-polymers of acrylonitrile and methyl acrylate, polyethylene terephthalate, aliphatic and aromatic polyamides, crystalline polymers and polyurethane engineering thermoplastics, said material being blended with said polyurethane prior to forming said container.

86. The container according to Claim 85, wherein said container includes up to about 70.0 wt.% polyester polyol based urethane.

87. The container according to Claim 74, wherein said container has a gas transmission rate of less than about 10.0 for nitrogen gas wherein said container has an average thickness of approximately 20.0 mils.

88. The container according to Claim 87, wherein said container has a gas transmission rate of less than about 7.5 for nitrogen gas wherein said container has an average thickness of approximately 20.0 mils.

89. The container according to Claim 74, wherein said container is elastomeric.

90. The container according to Claim 89, wherein said container has an elongation of at least about 250%.

91. The container according to Claim 89, wherein said container has a tensile strength of at least about 2,500 psi.

92. The container according to Claim 89, wherein said container has an 100% tensile modulus of between 350 to about 3,000 psi.

93. The container according to Claim 74, wherein said container has a durometer hardness ranging from about 60 Shore A to about 65 Shore D.

94. The container according to Claim 74, wherein said polyurethane is prepared from an isocyanate that is aromatic in nature.

95. The container according to Claim 74, wherein said polyurethane includes:

(a) at least 50 wt.% of at least one barrier material selected from the group consisting of co-polymers of ethylene and vinyl alcohol, polyvinylidene chloride, co-polymers of acrylonitrile and methyl acrylate, polyethylene terephthalate, aliphatic and aromatic polyamides, crystalline polymers and polyurethane engineering thermoplastics, said at least one barrier material being blended with said polyurethane prior to forming said container;

(b) 1 wt.% to about 50 wt.% of at least one aliphatic thermoplastic urethane; and

(c) up to about 3 wt.% of one or more aromatic thermoplastic urethanes, wherein the total constituency of the blended layer is equal to 100 wt.%.

96. The container according to Claim 74, wherein said container is in the form of a multi-layer structure including at least first and second layers, said first layer comprising said polyurethane including a polyester polyol which is formed from the reaction product of a carboxylic acid having six or less carbon atoms and a diol having six or less carbon atoms wherein the repeating units of the reaction product has eight carbon atoms or less.

97. The container according to Claim 96, further comprising a second layer formed from a material selected from the group consisting of co-polymers of ethylene and vinyl alcohol, polyvinylidene chloride, co-polymers of acrylonitrile and methyl acrylate, polyethylene terephthalate, aliphatic and aromatic polyamides, crystalline polymers, polyurethane engineering thermoplastics and mixtures thereof which is bonded to said first layer.

98. The container according to Claim 74, wherein said container is permanently sealed.

99. The container according to Claim 98, wherein said container includes a captive gas.

100. The container according to Claim 74, wherein said container is in the form of a supporting element.

101. The container of according to Claim 100, wherein said support element is incorporated into an article of furniture.

102. The container according to Claim 101, wherein said article of furniture is a chair.

103. The container according to Claim 102, wherein said supporting element is a lumbar support structure.

104. The container according to Claim 74, wherein said container is in the form of an inflatable ball.

105. A cushioning device formed from a membrane comprising:

a polyurethane including a polyester polyol, said membrane having a gas transmission rate of less than about 15.0 for nitrogen gas wherein said membrane has an average thickness of approximately 20.0 mils.

106. The cushioning device according to Claim 105, wherein said polyester polyol of said polyurethane is selected from the group consisting of the reaction product of (a) a carboxylic acid having six or less carbon atoms and (b) a diol having six or less carbon atoms, wherein the repeating units of the polyester polyol formed by the aforesaid reaction has eight carbon atoms or less.

107. The cushioning device according to Claim 106, wherein the carboxylic acid is selected from the group consisting of adipic, glutaric, succinic, malonic and oxalic acids, and mixtures thereof.

108. The cushioning device according to Claim 106, wherein the diol is selected from the group consisting of ethylene glycol, propanediol, butanediol, neopentyldiol, pentanediol, hexanediol and mixtures thereof.

109. The cushioning device according to Claim 106, further comprising at least one extender.

110. The cushioning device according to Claim 106, further comprising a hydrolytic stabilizer.

111. The cushioning device according to Claim 106, further comprising at least one plasticizer.

112. The cushioning device according to Claim 106, further comprising at least one flame retardant.

113. The cushioning device according to Claim 106, wherein at least one additive is employed, said additive being selected from the group consisting of antioxidants, ultra-violet stabilizers, thermal stabilizers, light stabilizers, organic anti-block compounds, colorants, fungicides, mold release agents and lubricants, said at least one additive being present in an amount of up to 3.0 wt.%.

114. The cushioning device according to Claim 106, wherein said polyurethane includes at least one filler, said filler being present in an amount of up to 60 wt.%.

115. The cushioning device according to Claim 106, wherein said cushioning device includes at least one polyurethane including soft segments selected from the group consisting of polyether polyols, polyester polyols formed from the reaction product of a carboxylic acid and a diol wherein the repeating units of the reaction product has more than eight carbon atoms, and mixtures thereof.

116. The cushioning device according to Claim 106, wherein said polyurethane includes up to 30 wt.% of soft segments selected from the group consisting of polyether polyols, polyester polyols formed from the reaction product of at least one carboxylic acid and at least one diol wherein the repeating units of the reaction product thereof includes more than eight carbon atoms, or mixtures thereof.

117. The cushioning device according to Claim 105, further comprising at least one material selected from the group consisting of co-polymers of ethylene and vinyl alcohol, polyvinylidene chloride, co-polymers of acrylonitrile and methyl acrylate, polyethylene terephthalate, aliphatic and aromatic polyamides, crystalline polymers and polyurethane engineering thermoplastics, said material being blended with said polyurethane prior to forming said cushioning device.

118. The cushioning device according to Claim 105, wherein said cushioning device has a gas transmission rate of less than about 10.0 for nitrogen gas wherein said cushioning device has an average thickness of approximately 20.0 mils.

119. The cushioning device according to Claim 118, wherein said cushioning device has a gas transmission rate of less than about 7.5 for nitrogen gas wherein said cushioning device has an average thickness of approximately 20.0 mils.

120. The cushioning device according to Claim 105, wherein said cushioning device is elastomeric.

121. The cushioning device according to Claim 120, wherein said cushioning device has an elongation of at least about 250%.

122. The cushioning device according to Claim 120, wherein said cushioning device has a tensile strength of at least about 2,500 psi.

123. The cushioning device according to Claim 120, wherein said cushioning device has an 100% tensile modulus of between 350 to about 3,000 psi.

124. The cushioning device according to Claim 105, wherein said cushioning device has a durometer hardness ranging from about 60 Shore A to about 65 Shore D.

125. The cushioning device according to Claim 105, wherein said polyurethane is prepared from an isocyanate that is aromatic in nature.

126. The cushioning device according to Claim 105, wherein said polyurethane includes:

(a) at least 50 wt.% of at least one barrier material selected from the group consisting of co-polymers of ethylene and vinyl alcohol, polyvinylidene chloride, co-polymers of acrylonitrile and methyl acrylate, polyethylene terephthalate, aliphatic and aromatic polyamides, crystalline polymers and polyurethane engineering thermoplastics, said at least one barrier material being blended with said polyurethane prior to forming said membrane;

(b) 1 wt.% to about 50 wt.% of at least one aliphatic thermoplastic urethane; and

(c) up to about 3 wt.% of one or more aromatic thermoplastic urethanes, wherein the total constituency of the blended layer is equal to 100 wt.%.

127. The cushioning device according to Claim 105, wherein said cushioning device is in the form of a multi-layer structure including at least first and second layers, said first layer comprising said polyurethane including a polyester polyol which is formed from the reaction product of a carboxylic acid having six or less carbon atoms and a diol having six or less carbon atoms wherein the repeating units of the reaction product has eight carbon atoms or less.

128. The cushioning device according to Claim 127, further comprising a second layer formed from a material selected from the group consisting of co-polymers of ethylene and vinyl alcohol, polyvinylidene chloride, co-polymers of acrylonitrile and methyl acrylate, polyethylene terephthalate, aliphatic and aromatic polyamides, crystalline polymers, polyurethane engineering thermoplastics and mixtures thereof which is bonded to said first layer.

129. The cushioning device according to Claim 105, wherein said cushioning device is employed as part of a seat.

130. The cushioning device according to Claim 129, wherein said seat is a bicycle seat.

131. The cushioning device according to Claim 129, wherein said seat is a saddle.

132. The cushioning device according to Claim 105, wherein said cushioning device is incorporated into protective equipment.

133. The cushioning device according to Claim 132, wherein said protective equipment is a shin guard.

134. The cushioning device according to Claim 132, wherein said protective equipment is a helmet.

135. The cushioning device according to Claim 105, wherein said cushioning device is a component of a shoe.

136. The cushioning device according to Claim 135, wherein said shoe includes an upper and a sole, said cushioning device being in the form of an inflatable bladder incorporated as a portion of said sole.

137. The cushioning device according to Claim 136, wherein said inflatable bladder serves as a portion of an outsole which is at least partially exposed to the atmosphere.

138. The cushioning device according to Claim 136, wherein said inflatable bladder is formed at least in part of a thermoset material.

139. The cushioning device according to Claim 136, wherein said inflatable bladder includes at least one port for the selective introduction of a fluid.

140. The cushioning device according to Claim 139, wherein said fluid is a gas.

141. The cushioning device according to Claim 140, wherein said gas is at a pressure of greater than 0 psig.

142. The cushioning device according to Claim 136, wherein said inflatable bladder has an average thickness of between 5 to about 60 mils.

143. The cushioning device according to Claim 142, wherein said inflatable bladder has an average thickness of between 15 to about 40 mils.

144. The cushioning device according to Claim 105, wherein said membrane is a component of a skate.

145. The cushioning device according to Claim 105, wherein said cushioning device has a durability of at least 200,000 cycles under a KIM test analysis, wherein said cushioning device has an average thickness of 18 mils and is inflated with nitrogen gas to 20.0 psig.

146. The cushioning device according to Claim 145, wherein said cushioning device has a durability of more than 750,000 cycles under a KIM test analysis, wherein said cushioning device has an average wall thickness of 18 mils and is inflated with nitrogen gas to 20.0 psig.

147. The cushioning device according to Claim 105, wherein said cushioning device has a yellowness index of 4.0 or less, wherein said membrane has an average wall thickness of 32 mils.

148. The cushioning device according to Claim 147, wherein said cushioning device has a yellowness index of 1.6 or less, wherein said cushioning device has an average thickness of 32 mils.

149. The cushioning device according to Claim 105, wherein said cushioning device has a total transmission of light at a level of at least 90.0 %, wherein said cushioning device has an average wall thickness of 32 mils.

150. A hydropneumatic accumulator formed from a membrane comprising:

a polyurethane including a polyester polyol, said membrane having a gas transmission rate of 15.0 or less for nitrogen gas wherein said membrane has an average thickness of approximately 20.0 mils.

151. The accumulator according to Claim 150, wherein said polyester polyol of said polyurethane is selected from the group consisting of the reaction product of (a) a carboxylic acid having six or less carbon atoms and (b) a diol having six or less carbon atoms, wherein the repeating units of the polyester polyol formed by the aforesaid reaction has eight carbon atoms or less.

152. The accumulator according to Claim 151, wherein the carboxylic acid is selected from the group consisting of adipic, glutaric, succinic, malonic and oxalic acids, and mixtures thereof.

153. The accumulator according to Claim 151, wherein the diol is selected from the group consisting of ethylene glycol, propanediol, butanediol, neopentyldiol, pentanediol, hexanediol and mixtures thereof.

154. The accumulator according to Claim 151, further comprising at least one extender.

155. The accumulator according to Claim 151, further comprising a hydrolytic stabilizer.

156. The accumulator according to Claim 151, wherein said polyurethane includes at least one plasticizer, said plasticizer being present in an amount of up to 40.0 wt.%

157. The accumulator according to Claim 151, wherein said polyurethane includes at least one flame retardant, said flame retardant being present in an amount of up to 40.0 wt.%.

158. The accumulator according to Claim 151, wherein at least one additive is employed, said additive being selected from the group consisting of antioxidants, ultra-violet stabilizers, thermal stabilizers, light stabilizers, organic anti-slip compounds, anti-block compounds, colorants, fungicides, mold release agents and lubricants, said at least one additive being present in an amount of up to 3.0 wt.%.

159. The accumulator according to Claim 151, wherein said accumulator includes at least one polyurethane including soft segments selected from the group consisting of polyether polyols, polyester polyols formed from the reaction product of a carboxylic acid and a diol wherein the repeating units of the reaction product has more than eight carbon atoms, and mixtures thereof.

160. The accumulator according to Claim 151, wherein said polyurethane includes up to 30 wt.% of soft segments selected from the group consisting of polyether polyols, polyester polyols formed from the reaction product of at least one carboxylic acid and at least one diol wherein the repeating units of the reaction product thereof includes more than eight carbon atoms, or mixtures thereof.

161. The accumulator according to Claim 150, wherein said accumulator further comprises at least one material selected from the group consisting of co-polymers of ethylene and vinyl alcohol, polyvinylidene chloride, co-polymers of acrylonitrile and methyl acrylate, polyethylene terephthalate, aliphatic and aromatic polyamides, crystalline polymers and polyurethane engineering thermoplastics, said material being blended with said polyurethane prior to forming said accumulator.

162. The accumulator according to Claim 161, wherein said accumulator includes up to about 70.0 wt.% polyester polyol based urethane.

163. The accumulator according to Claim 150, wherein said accumulator has a gas transmission rate of less than about 10.0 for nitrogen gas wherein said accumulator has an average thickness of approximately 20.0 mils.

164. The accumulator according to Claim 163, wherein said accumulator has a gas transmission rate of less than about 7.5 for nitrogen gas wherein said accumulator has an average thickness of approximately 20.0 mils.

165. The accumulator according to Claim 150, wherein said accumulator is elastomeric.

166. The accumulator according to Claim 165, wherein said accumulator has an elongation of at least about 250%.

167. The accumulator according to Claim 165, wherein said accumulator has a tensile strength of at least about 2,500 psi.

168. The accumulator according to Claim 165, wherein said accumulator has an 100% tensile modulus of between 350 to about 3,000 psi.

169. The accumulator according to Claim 150, wherein said accumulator has a durometer hardness ranging from about 60 Shore A to about 65 Shore D.

170. The accumulator according to Claim 150, wherein said polyurethane is prepared from an isocyanate that is aromatic in nature.

171. The accumulator according to Claim 150, wherein said polyurethane includes:

(a) at least 50 wt.% of at least one barrier material selected from the group consisting of co-polymers of ethylene and vinyl alcohol, polyvinylidene chloride, co-polymers of acrylonitrile and methyl acrylate, polyethylene terephthalate, aliphatic and aromatic polyamides, crystalline polymers and polyurethane engineering thermoplastics, said barrier material being blended with said polyurethane prior to forming said accumulator;

(b) 1 wt.% to about 50 wt.% of at least one aliphatic thermoplastic urethane; and

(c) up to about 3 wt.% of one or more aromatic thermoplastic urethanes, wherein the total constituency of the blended layer is equal to 100 wt.%.

172. The accumulator according to Claim 150, wherein said accumulator is in the form of a multi-layer structure including at least first and second layers, said first layer comprising said polyurethane including a polyester polyol which is formed from the reaction product of a carboxylic acid having six or less carbon atoms and a diol having six or less carbon atoms wherein the repeating units of the reaction product has eight carbon atoms or less.

173. The accumulator according to Claim 172, further comprising a second layer formed from a material selected from the group consisting of co-polymers of ethylene and vinyl alcohol, polyvinylidene chloride, co-polymers of acrylonitrile and methyl acrylate, polyethylene terephthalate, aliphatic and aromatic polyamides, crystalline polymers, polyurethane engineering thermoplastics and mixtures thereof which is bonded to said first layer.

174. The accumulator according to Claim 150, wherein said accumulator separates two fluids.

175. The accumulator according to Claim 174, wherein said fluids include a gas disposed along one side of said accumulator and a liquid disposed along another side of said accumulator.

176. A method for producing a laminated membrane useful for controlling gas permeation therethrough, comprising the steps of:

(a) extruding a first layer of polyurethane including a polyester polyol; and

(b) extruding a second layer of material together with said first layer, said second layer including functional groups with hydrogen atoms which are capable of participating in hydrogen bonding with said first layer of polyurethane to form a membrane;

said membrane being characterized in that the resulting membrane has a gas transmission rate of 15.0 or less for nitrogen gas when said membrane has an average thickness of 20.0 mils.

177. The method according to Claim 176, wherein said membrane has a tensile strength of at least about 2,500 psi.

178. The method according to Claim 176, wherein said membrane has an 100% tensile modulus of between 350 to about 3,000 psi.

179. The method according to Claim 176, wherein said membrane has a durometer hardness ranging from about 60 Shore A to about 65 Shore D.

180. The method according to Claim 176, wherein said first and second layers are laminated together at a pressure of at least 200 psi.

181. The method according to Claim 176, wherein said first and second layers are extruded simultaneously.

182. The method according to Claim 176, wherein the average thickness of said first and second layers can be varied over the length of the membrane.

183. The method according to Claim 176, wherein said membrane has a durability of at least 200,000 cycles under a KIM test analysis wherein said membrane is in the form of a closed container having an average wall thickness of 18 mils and is inflated with nitrogen gas to 20.0 psig.